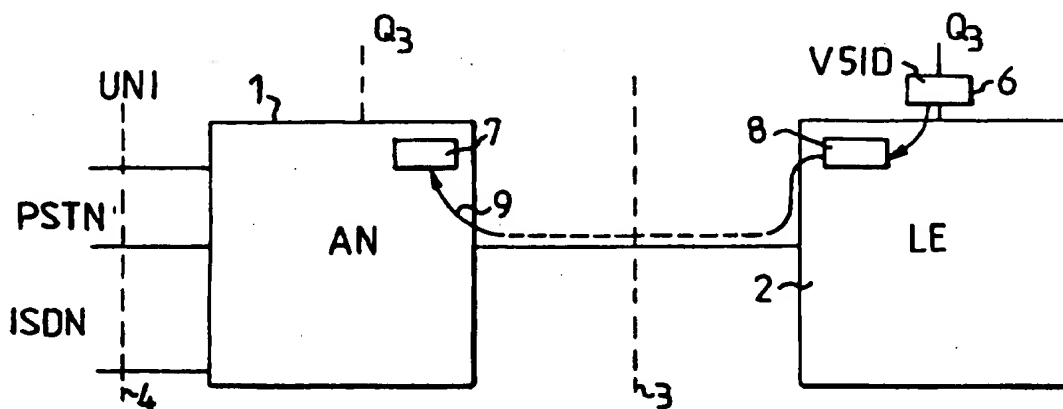




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>6</sup> : <b>H04L 12/24, H04Q 3/00</b>	<b>A1</b>	(11) International Publication Number: <b>WO 97/35404</b> (43) International Publication Date: 25 September 1997 (25.09.97)
<p>(21) International Application Number: PCT/SE97/00446</p> <p>(22) International Filing Date: 17 March 1997 (17.03.97)</p> <p>(30) Priority Data: 9601047-5 19 March 1996 (19.03.96) SE</p> <p>(71) Applicant (for all designated States except US): TELEFON-AKTIEBOLAGET LM ERICSSON (publ) [SE/SE]; S-126 25 Stockholm (SE).</p> <p>(72) Inventor; and (75) Inventor/Applicant (for US only): HASTER, Lars-Olof [SE/SE]; Movågen 12, S-141 31 Huddinge (SE).</p> <p>(74) Agents: ANDERSSON, M. et al.; H. Albiñns Patentbyrå AB, P.O. Box 3137, S-103 62 Stockholm (SE).</p>	<p>(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p>Published With international search report.</p>	

(54) Title: **METHOD AND ARRANGEMENT RELATING TO THE INSTALLATION OF A NEW SUBSCRIBER IN A TELECOMMUNICATIONS NETWORK**



## (57) Abstract

The invention relates to a method and an arrangement to establish a telecommunication through an interface (V5.1; V5.2) between an Access Network (AN) and a Local Exchange (LE) regarding a new subscriber to be connected to a user port in the Access Network. According to standard procedures identification data regarding the new subscriber is provided to both the AN and the LE from a standardized management Q3 interface. According to the invention the identification data is only provided to the LE and stored (8) there. This identification data is then transferred to the AN to be stored (7) there at an installation operation for the subscriber.

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Method and arrangement relating to the installation of a new subscriber in a telecommunications network

#### FIELD OF INVENTION

5       The present invention relates to a method and an arrangement to establish telecommunications opportunities between an Access Network (AN) and a Local Exchange (LE) regarding a new subscriber to be connected to the Access Network.

#### 10       STATE OF THE ART

15       The European Telecommunications Standard Institute (ETSI) has produced standards of type V, the V5.1 and V5.2 interfaces (ETS 300 324-1 and ETS 300 347-1), as an interface between  
20       two systems, an Access Network (AN) and a Local Exchange (LE), with flexible (provisioned) information channel (bearer channel) allocation. Supported access types in the V5 interface standard are ISDN-BA and PSTN services. ISDN-BA are provided for digital communication and PSTN for speech  
25       communication. Both the AN and the LE are connected to the likewise standardized management Q3 interface, which supplies both the AN and the LE with information about for instance new subscribers.

30       An Access Network AN is a system which is implemented between the Local Exchange LE and the user. The functions associated with the V5 interface or interfaces of an AN can be configured and operated flexibly via the management Q3 interface. An AN may for instance comprise multiplexing, cross-connect and  
35       transmission functions. The V5 interface is independent of the transmission media and used inside the AN and the LE. An AN may furthermore support services outside the scope of the standard.

      The bearer channel means a 64 kbit/s time slot in the V5.1 interface allocated for a B-channel (Speech and Data Transmission channel) of an ISDN user port or a PCM (Pulse Code Modulation) encoded 64 kbit/s channel from a PSTN user port. A user port means a physical port implemented in the AN to

provide the relevant interface functions towards the user. The user port is addressed by a logical address used in the relevant protocols on the V5 interface. The V5 interface is a general term for the family of V interfaces for connection of ANs to the LE, e.g. a V5.1 or a V5.2 interface.

The V5 interface is standardized by ETSI TC SPS3 and transferred to ITU-T. The V5 standard is defined such that every configuration of ports, channels and features are to be handled by the management Q3 interface, Q3<sub>AN</sub> disclosed in ETS 300 376-1 and Q3<sub>LE</sub> in ETS 300 377-1. This is expensive in the case where AN is a small unit.

Small Access Networks are implemented with only one 2048 kbit/s digital link while larger Access Networks have several links of that kind. Small ANs could use both the V5.1 and V5.2 interface standard while larger ANs could use only V5.2.

#### OBJECTS OF THE INVENTION

An object of the invention is to provide an arrangement, in which the existing standard is used but in a way to ease the managing of Access Networks, particularly small ones.

Another object of the invention is to provide an arrangement which have practically no affect on the standardized AN, LE and V5 protocols.

A solution to the objects of the invention is described in independent claims. Further features and developments of the invention are described in the dependent claims.

The invention relates to a method and an arrangement to establish a telecommunication through an interface (V5.1; V5.2) between an Access Network (AN) and a Local Access Network regarding a new subscriber to be connected to a user port in the Access Network, data regarding the new subscriber being provided from a standardized management Q3 interface.

According to the invention the data regarding the subscriber is only provided to either the AN or the LE, and that the other means of the two is adapted to be provided with the data transfered at an installation operation for the subscriber. Preferably, it is the LE which is provided with the data regarding the subscriber. The interface between the AN and the LE should be a V5 interface and amendments in the management procedure for the AN are provided such that procedure steps regarding the data transfered at said installation operation are jumped if the management procedure should be provided in a system having both the AN and the LE provided with said data from the management Q3 interface.

In this way the configuration and the standardized protocol in neither the AN nor the LE regarding traffic between them are affected once the transfer is done and the data is stored. Support in the protocol for not doing the standard features has been used while not affecting the standard.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The invention will in the following be further described in a non-limiting way under reference to the accompanying drawings in which:

FIG 1      schematically indicates the V5 architecture as standardized by ETSI.

FIG 2      schematically indicates the architecture according to the invention.

FIG 3      shows a signalling diagram between the AN and the LE in accordance with the invention.

FIG 4      shows a part of a flow chart with operations according to the invention inserted.

FIG 5      illustrates the protocol in both the AN and the LE.

FIG 6 shows a signalling diagram between the LE and the AN in accordance with a development of the invention.

5

## DETAILED DESCRIPTION OF THE INVENTION

With reference to FIG 1, in which the prior art is illustrated, an Access Network (AN) 1 has a connection to a Local  
10 Exchange (LE) 2 through a standardized interface 3, for instance the ETSI standard interface V5.1 defined in ETS 300 324-1, or the ETSI standard interface V5.2 defined in ETS 300 347-1. The interface 3 comprises at least one 2048 kbit/s digital link for the multiplexing of up to thirty PSTN  
15 (Public Switched Telephone Network) or fifteen ISDN-BA (Integrated Services Digital Network - Basic Access) accesses represented by a number of allocated multiplexed time channels. Both the AN and the LE are connected to the standardized management Q3 interface. As schematically  
20 indicated to the left in FIG 1, a User Network Interface (UNI) 4 is connected between the AN and the user ports for users which could use both PSTN and ISDN.

When, according to the prior art, a new subscriber is  
25 introduced in the system at least identification data for the subscriber is provided into both the AN and the LE through the interface Q3, as schematically illustrated by the blocks 5 and 6 in FIG 1. The V5 interface (V5ID) is a unique number of a V5.1 interface and shall be a 24 bit number. This data  
30 is stored in stores 7 and 8, respectively. For protocols between the AN and the LE the identity of that particular subscriber use the identifications stored in the stores 7 and 8, as illustrated by arrows.

35 According to the invention, and illustrated in FIG 2, only the LE need be connected to the interface Q3. The AN could also be connected to the interface Q3, but then only for the purpose of checking and/or repairing or the like.

The V5 standard has a parameter V5ID, which is the important parameter to be discussed in relation to the invention. The communication is transferred between the AN and the LE in multiplexed time slots, called channels. The C-channel is a predetermined time slot, i.e. TS16, used for the purpose of controlling between the AN and the LE in V5. Then, there are thirty B-channels for communication transmission. The parameter V5ID is also used for connecting LE and/or AN to other features, such as:

- \* the relation between a subscriber and a time slot for a communication in the bearer channel between the AN and the LE through V5, which is connected to the corresponding subscriber line and physic port in AN to which the subscriber is connected.
- \* V5ID is a pre-requisite for the AN and the LE to be able to communicate with each other via the C-channel TS16 regarding communication set up for an installed customer.

Principally, the AN and the LE could be defined independently of each other. The V5ID and/or a variant of it, which for instance could be upgrading of software done at different instances, in both the AN and the LE are necessary in order to start the communication and to set up communication links using the C-channel TS16.

According to the invention data regarding new subscribers or other data to be shared by both the AN and LE is provided only to one of them, preferably the LE, which, when appropriate, transfers it via the interface 3 to the other one of them, as illustrated by the dashed arrow 9 from the store 8 to the store 7. In this way the configuration and the standardized protocol in neither the AN nor the LE regarding traffic between them are affected once the transfer is done and the identity is stored. Thus what is done is to use what has support in the protocol for not doing the standard features while not affecting the standard.

A set up is illustrated in the information flow diagram in FIG. 3. The subscriber station is physically connected to a user part in the AN via the interface UNI 3. The LE has got the identification of the subscriber and to which AN the subscriber station is connected through the interface Q3 and it is stored in the storage cell 8. Also, for the V5.1 standard, a channel is allocated to the subscriber station. At startup the AN sends a signal COMMON CONTROL/ACK to the LE with a request for identification of the subscriber. The LE sends the subscriber identification V5ID stored in the storage cell 8 to the requesting AN which stores it in its storage cell 7.

This is also illustrated in FIG 4 which shows a flow chart of the system startup interval and a part of the State AN1 (SYS) of the process AN\_SYSTEM\_MANAGEMENT corresponding to the pages 217 and 218 in ETS 300 324-1:1994 but with some amendments done in accordance with the invention. Only the parts of the flow chart influenced by the invention are shown. Directly after start in S1 an initiation of the variant & interface ID to be fetched from LE or from Q3 is done in S2. The step S2 is an addition in accordance with the invention. It is designed such that both the prior art system and the system according to the invention could be served. Thus, the existing standard is not affected.

Thereafter, a MDL (Management of DL) establish request in S3 to AN control DL (primitive between layer 2 and layer 3) is done in accordance with the Standard ETS 300 324-1:1994. This request is transfered to step S4 in State AN1(SYS), of which a part is shown, together with an addition in accordance with the invention.

In accordance with the invention, a check is done in S5 if the storage 7 need be updated with the interface V5ID. If the answer is YES then, in step S6, store the V5ID value fetched from the LE and then proceed with the next step S7. If the answer is NO then proceed directly with the next step S7.



This addition will not affect the standard, because in that standard the V5ID should already have been stored from the interface Q3 and the answer in the step S5 would be NO.

5 Then the program will proceed according to the standard by checking if the stored V5ID are identical in the AN and the LE and to provide an error indication, in step S8, if they are not identical, and if they are identical to proceed to the step S9. A check is done whether PSTN is provisioned or  
10 not. If it is not provisioned then it is placed IN SERVICE in step S10. If it is provisioned then an MDL\_ESTABLISH\_REQUEST is done in step S11 and PSTN is activated in step S12.

15 In order to start traffic the LE will deblock the particular user port in the AN connected to the interface UNI in FIG 2 and pointed out by the L3addr, for both ISDN and PSTN, in the protocol for PORT CONTROL (ETS 300 324-1:1994, page 119, Table 50) provided for messages between the the AN and the LE and briefly illustrated in FIG 5. The protocol comprises  
20 briefly a protocol discriminator, an L3addr denoting addresses within layer 3 messages both for PSTN and Control protocols to interfaces to networks and users, the type of message sent, and information elements in the message.

25 An LE has to be flexible enough in order to be able to be connected to different kinds of Access Networks dependent upon use and architecture, such as fibre lines, electrically conductive lines, radio links, SDH, or ATM as transmission medium. Simplifications in the AN connection nodes could be  
30 provided by having as many of them as possible predefined.

A number of traffic parameters need be defined in order to provide the right kind of subscriber service. It is appropriate to do this at the installation. Thus, according to a  
35 development of the invention and illustrated in FIG 6, this could be done in the same way as the installation of the identification installation between the AN and the LE. After the identification is transfered from the storage 8 in the LE to the AN and stored in the storage 7 then the LE makes an

ALLOCATE command including data about the subscriber to the AN which stores the data and sends back a communication ALLOCATE COMPLETE that the allocation is completed.

5 For V5.1, traffic parameters to be defined are for instance the B-channels in the interface 3 for transmission through the interface. The channels for the respective B-channels (UNI) shall be connected to a fixed B-channel through the interface 3. The exchange in the LE has the flexibility to  
10 connect an arbitrary user port (UP) of access type PSTN or ISDN to an optional bearer channel (time slot) and to be assigned an arbitrary address.

15 For V5.2, the LE does only know the logical address in order to provide the connection between a user B-channel and a bearer channel, and this is controlled by the Bearer Channel Connection (BCC) protocol in the V5.2 standard (ETS 300 347-1:1994).

20 Thus, firstly the interface is defined, and secondly the next operation is to define the channel in the interface which should have the signalling for the control protocol. ISDN and PSTN have different kinds of operations. Other kinds of operations attach the subscriber number to a particular time  
25 slot in the transmission through the interface, and then the L3-addr in the protocol is used.

30 As long as an AN node only has one type of access (ISDN or PSTN) then it is simple to define the channel relation and a logical address. However, in V5.1, when there is a mixture of both the access types in the same AN node, the addresses could need coordination to particular address areas. All this is appropriate to define at installation of a new subscriber.

## CLAIM

1. Method to establish a telecommunication opportunity through an interface (V5.1; V5.2) between an Access Network (AN) and a Local Exchange (LE) regarding a new subscriber to be connected to a user port in the Access Network, data regarding the new subscriber being provided from a standardized management Q3 interface, characterized in that the data regarding the subscriber is only provided to either the AN or the LE, and that the remaining network (AN or LE) of the two is adapted to be provided with the data transferred at an installation operation for the subscriber.

2. Method according to claim 1, characterized in that it is the LE which is provided with the data regarding the subscriber.

3. Method according to claim 1 or 2, characterized in that the interface between the AN and the LE is a V5 interface and that amendments in the management procedure for the AN are provided such that procedure steps regarding the data transferred at said installation operation are jumped if the management procedure should be provided in a system having both the AN and the LE provided with said data from the management Q3 interface.

4. Method according to anyone of the preceding claims, characterized in that the data to be transferred comprise the subscriber identification data.

5. Method according to claim 4, characterized in that the data to be transferred also comprises a number of traffic parameters.

6. Arrangement to establish a telecommunication opportunity through an interface (V5.1; V5.2) between an Access Network (AN) and a Local Exchange (LE) regarding a new subscriber to be connected to a user port in the Access Network, data regarding the new subscriber being provided from a standard-

ized management Q3 interface, characterized by first kind of storage means (8) in either the AN or the LE to store data regarding the new subscriber and provided through the management Q3 interface,

5 means (3) to transfer the data to the remaining network (AN or LE) of the two at an installation operation for the subscriber, and second kind of storage means (7) to store the transferred data there.

10 7. Arrangement according to claim 6, characterized in that the first kind of storage means (8) is provided in the LE.

15 8. Arrangement according to claim 6 or 7, characterized in that the interface between the AN and the LE is a V5 interface and that amendments in the management procedure for the AN are provided such that procedure steps regarding the data transferred at said installation operation are jumped if the management procedure should be provided in a system having  
20 both the AN and the LE provided with said data from the management Q3 interface.

25 9. Arrangement according to anyone of the claims 6 to 8, characterized in that the data to be transferred comprise the subscriber identification data.

30 10. Arrangement according to claim 9, characterized in that the data to be transferred also comprises a number of traffic parameters.

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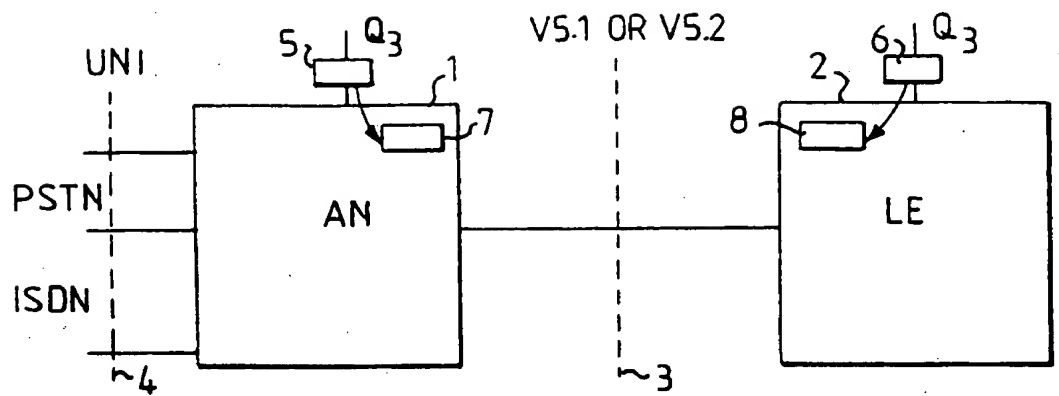


FIG. 1 (PRIOR ART)

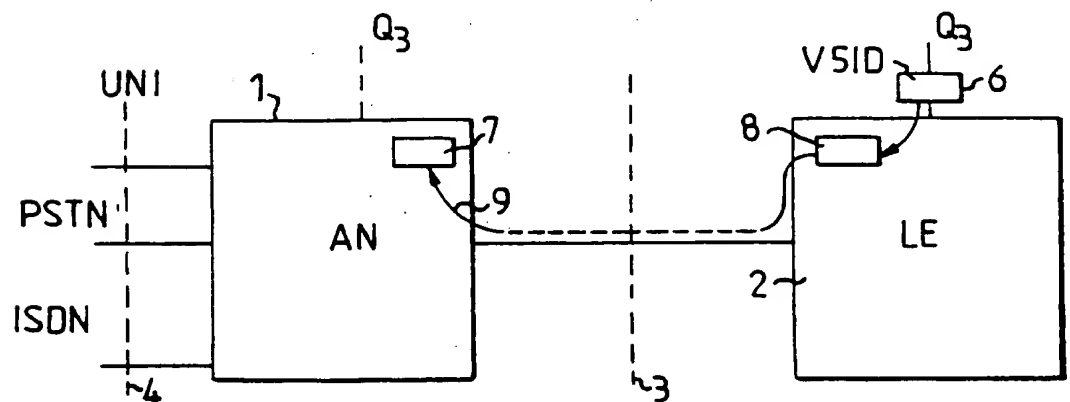


FIG. 2

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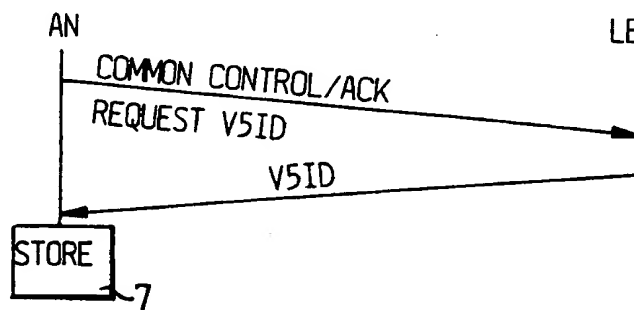


FIG. 3

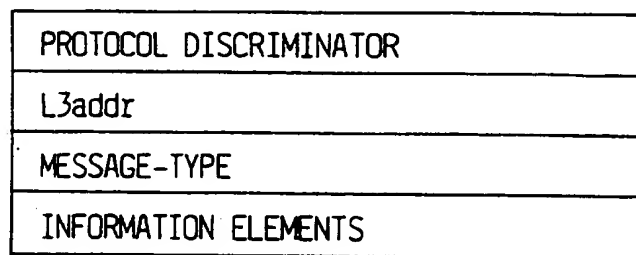


FIG. 5

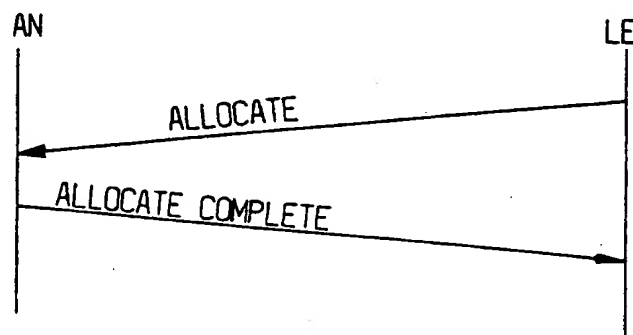


FIG. 6

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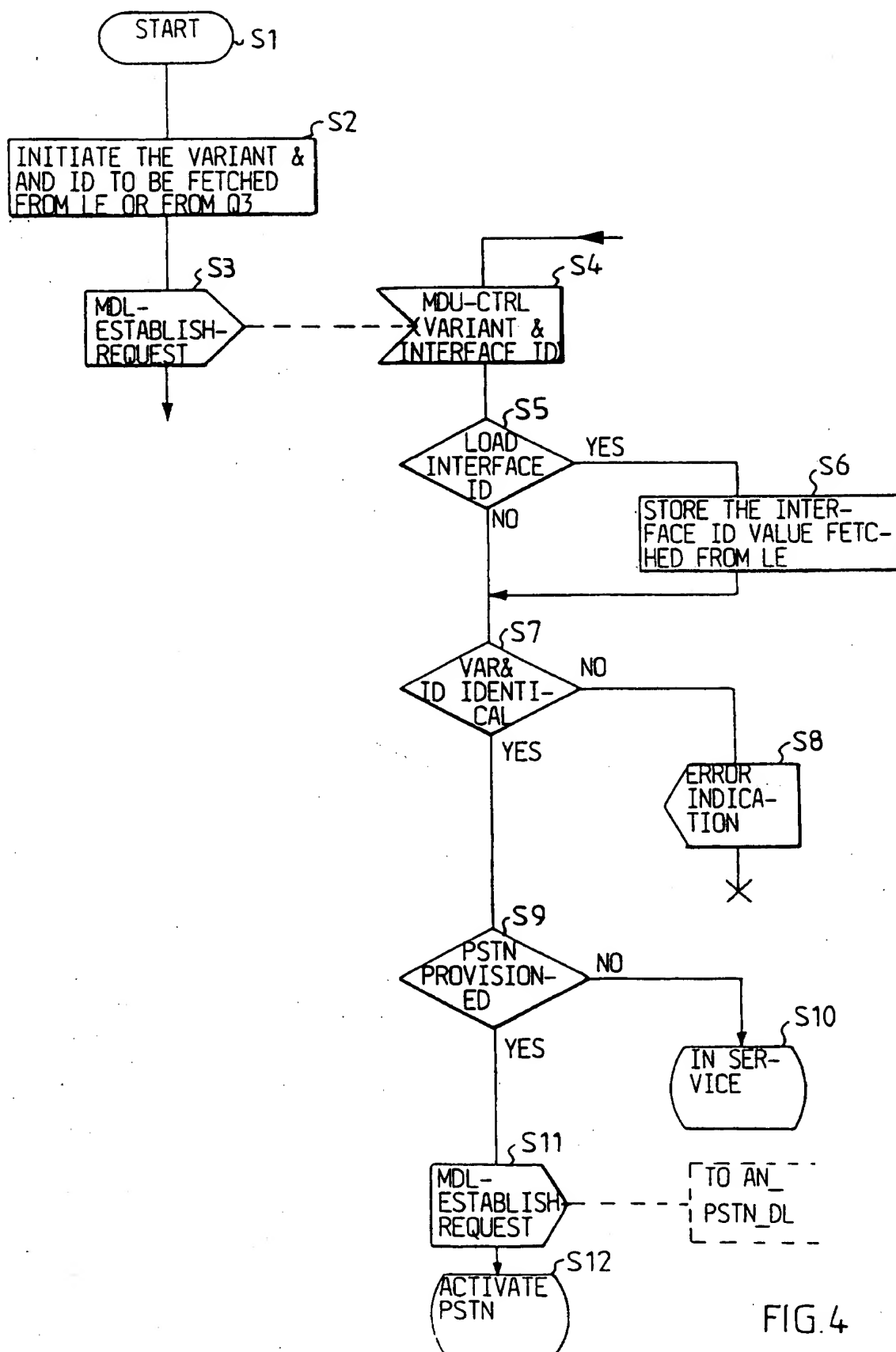


FIG.4

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 97/00446

## A. CLASSIFICATION OF SUBJECT MATTER

IPC6: H04L 12/24, H04Q 3/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: H04L, H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Frequenz, Volume 48, No 1-2, 1994, (Berlin, Germany), K. Khakzar, "V5 Interfaces between Digital Local Exchanges and Access Networks", page 44 - page 50, see especially paragraph 3.5 --	1-10
A	IEEE Global Telecommunications Conference, Volume 3, December 1992, (USA), A. Gillespie, "Interfacing Access Networks to Exchanges - The ETSI V5 Approach", page 1754 - page 1758, see especially paragraph 6 -----	1-10

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

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Date of the actual completion of the international search

12 June 1997

Date of mailing of the international search report

05 -07- 1997

Name and mailing address of the ISA/  
Swedish Patent Office  
Box 5055, S-102 42 STOCKHOLM  
Facsimile No. +46 8 666 02 86

Authorized officer

Anders Ströbeck  
Telephone No. +46 8 782 25 00